

High-Performance Electromagnetics Simulations

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We present recent development of high-order algorithms and software for solving nanophotonics and accelerator problems on high-performance architectures. Its application areas are relevant to optimal designing of nanoscience device and particle accelerator components. Our numerical approach is to use high-order spectral-element discontinuous Galerkin method with accurately representing complex geometries by curvilinear hexahedral meshes. Efficient parallel algorithms for communication between elements and spectrally accurate convergence will be addressed. We will demonstrate large-scale simulations with comparisons in performance and accuracy with other low-order methods.

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